U.S. Army River Crossing Doctrine and AirLand Battle Future: Applicable or Anachronistic?

A Monograph
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This monograph examines whether current U.S. Army river crossing doctrine is adequate to meet the unique challenges of tomorrow's battlefield. Under the AirLand Battle Future Concept (ALB-F), the future battlefield is expected to be highly dispersed and nonlinear; an environment in which survivability is largely a function of agility and mobility. The rapid tempo of ground force dispersion and concentration will present unique challenges to heavy forces conducting river crossing operations. This paper concludes that current river crossing doctrine (FM 90-13, River Crossing Operations, July 1990) has evolved into a more force, vice terrain oriented doctrine. Therefore, it is in step with emerging trends of future warfare. Nevertheless, the predicted future battlefield will demand that river crossings be conducted in a more decentralized manner. Although river crossings themselves should be decentralized, historical precedent indicates that in order to retain tactical and operational flexibility, the corps commander should retain centralized control over his limited bridging assets. Two techniques are discussed for doing this: (1) distribute bridging resources to maneuver elements as required or (2) retain all bridging and conduct corps-level assault float bridging operations. Finally, there appears to be a need to seriously evaluate force structure requirements to support river crossings on the ALB-F battlefield. On the nonlinear battlefield assault and follow-on bridging is likely to be used up very quickly.

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ABSTRACT

U.S. ARMY RIVER CROSSING DOCTRINE AND AIRLAND BATTLE FUTURE: APPLICABLE OR ANACHRONISTIC? by Major Gordon M. Wells, USA, 59 pages.

This monograph examines whether current U.S. Army river crossing doctrine is adequate to meet the unique challenges of tomorrow's battlefield. Under the Air-Land Battle Future Concept (ALB-F), the future battlefield is expected to be highly dispersed and nonlinear; an environment in which survivability is largely a function of agility and mobility. The rapid tempo of ground force dispersion and concentration will present unique challenges to heavy forces conducting river crossing operations.

This paper concludes that current river crossing doctrine (FM 90-13, River Crossing Operations, July 1990) has evolved into a more force, vice terrain oriented doctrine, as was previously the case. Therefore, it is in step with emerging trends of future warfare. Nevertheless, the predicted future battlefield will demand that river crossings be conducted in a more decentralized manner, from division to brigade level.

Although river crossings themselves will be decentralized, historical precedent indicates that in order to retain tactical and operational flexibility, the corps commander should retain centralized control over his limited bridging assets. Two techniques were discussed for doing this: (1) distribute bridging resources to maneuver elements as required or (2) retain all bridging and conduct corps-level assault float bridging operations for maneuver brigades.

Finally, there appears to be a need to seriously evaluate force structure requirements to support river crossings on the ALB-F battlefield. On the nonlinear battlefield assault and follow-on bridging is likely to be used up very quickly. Current force structure proposals should address this possibility.

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INTRODUCTION

> An army's fundamental doctrine is the condensed expression of its approach to fighting campaigns, major operations, battles, and engagements . . . it must be rooted in time-tested theories and principles, yet forward-looking and adaptable to changing technologies, threats, and missions.[1]

The world is changing rapidly. Yesterday's political "impossibilities" are now history today. That which was science fiction only a few years ago is now common household technology. Our ability to function in the world of tomorrow is largely a function of our ability to anticipate and adapt. On the battlefield, the ability to adapt to changing technologies, threats, and missions will ultimately determine victory or defeat.

Theorists are predicting a battlefield of tomorrow which is governed by extremely lethal weapons guided to their targets by a command and control system serviced by near perfect intelligence. Tomorrow's battlefield is expected to be highly dispersed and nonlinear; an environment in which survivability is largely a function of agility and mobility. If these predictions prove correct, the traditional missions of combat engineers (mobility, countermobility, survivability) will be severely tested.

U.S Army river crossing doctrine has traditionally

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[1]U.S. Army, Field Manual 100-5, Operations, (Washington, D.C.: U.S. Government Printing Office, May 1986), p. 6.

been experienced on a linear battlefield where assets can be massed in a relatively methodical manner. The predicted nonlinear battlefield of the future will require units to follow the Napoleonic maxim of moving separately and fighting together to an extreme never experienced before. Thus, the high tempo of dispersion and concentration on the future battlefield will present unique challenges to forces conducting river crossing operations. The purpose of this paper is consider the future battlefield and evaluate whether our current river crossing doctrine, designed to cross heavy divisional forces, can meet its challenges.

> Apart from future improvements in arms, it is easy to see with existing improvements the following consequences: (1) The opening of battles from much greater distances than formerly; (2) the necessity of loose formation in attack; (3) the strengthening of the defence; (4) the increase in the area of the battlefield; and (5) the increase in casualties.[2]

These words were written in 1899 by a Polish banker named Ivan Bloch who predicted that major wars between the great powers had become too expensive to wage. Although you could debate his basic thesis, several of his predictions of what the future battlefield would look like proved ominously true just fifteen years later: "Certainly, . . . the next war . . . will be a great war of entrenchments. The spade will be as indispensable to a soldier as his rifle."[3] Of more contemporary interest, however, is Bloch's idea that improvements in weapons technology would have a direct impact on the expansion of the battlefield.

Several modern day theorists have likewise picked up the theme of the expanding battlefield. For example, James Schneider's description of the ***empty battlefield*** is useful. Mr. Schneider suggests that the introduction of four technological changes in the last

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[2]Jean de Bloch, The Future of War in its Technical, Economic, and Political Relations, translated by R.C. Long (Boston: Doubleday & McClure Co., 1899), p. 5.

[3]Ibid, p. xxvii.

century worked together to precipitate the dispersion of units on the battlefield: the rifled bullet, breech-loading weapons, magazine-fed firearms, and smokeless powder.[4] Looking to the future, Chris Bellamy, in his book, The Future of Land Warfare, suggests that technology will continue to cause the battlefield to disperse:

> The battlefield is expanding. Formations of a given size can dominate a vastly greater area than in either world war. . . . The development of terminally-guided indirect-fire systems and the parallel and indispensable development of air and space surveillance will make forces, including armour deployed tens, even hundreds of kilometres deep, vulnerable.[5]

Bellamy further discusses certain technological developments which are likely to influence future warfare: increased use of artificial intelligence (AI), robotics, significant increases in the lethality and accuracy of conventional weapons, etc.[6]

Likewise concerned about future trends in warfare, the U.S. Army is currently developing the AirLand Battle Future (ALB-F) Concept. Conceptually, the ALB-F concept differs from our current ALB doctrine in several ways. First, current doctrine envisions a linear disposition of forces which degrades into nonlinear

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[4]James J. Schneider, "The Theory of the Empty Battlefield," RUSI Journal of the Royal United Services Institute for Defence Studies, (September 1987), pp. 37-44.

[5]Chris Bellamy, The Future of Land Warfare (New York: St. Martin's Press, 1987), p. 298.

[6]Ibid, pp. 214-215.

warfare with enemy and friendly forces intermingled, whereas ALB-F foresees forces being initially disposed nonlinearly. Second, the ALB-F concept is force oriented whereas ALB doctrine tends to be more terrain oriented (in large degree due to political constraints imposed by NATO). Finally, while ALB doctrine tends to view survivability as a function of physical protection (well-prepared defensive positions, armored systems, etc.), the ALB-F concept foresees survivability largely as a function of agile, mobile units.[7]

As alluded to by theorists like Chris Bellamy, a number of technological developments are expected to weigh heavily in the ultimate evolution of the ALB-F concept.[8] For example, significant improvements in intelligence acquisition and processing are already somewhat possible such as near real-time intelligence based on unmanned aerial vehicles (UAVs), space-based reconnaissance, and analysis by artificial intelligence (AI). Improvements in firepower capabilities which already exist or are close to fielding include improved fire-and-forget weapons (*brilliant munitions* which do not require target designators), highly lethal conventional warheads such as air-fuel explosives, improved

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[7]Most of the information on the AirLand Battle-Future Concept discussed in this paper comes from two unpublished documents provided by the Concepts and Force Alternatives Directorate, Combined Arms Combat Developments Agency (CACDA): (1) "Evolution of the Army: Using Concepts from Airland Battle-Future," Final Coordinating Draft, 11 Sep 90; (2) "AirLand Battle Future Umbrella Concept," TRADOC 525-XX, Draft as of 31 Aug 90.

[8]Bellamy, pp. 214-215.

dynamic obstacles, and extended range fire support systems such as the Army Tactical Missile System (ATACMS). In addition, the increased use of robotics and AI systems to reduce manpower requirements, and global precision location systems to provide accurate location data on friendly units are expected to be a part of future warfare.[9]

These technological developments will significantly impact our approach to how we expect to wage conventional warfare. Therefore, the ALB-F concept describes a nonlinear battlefield across which friendly units are dispersed to maximize their survivability against sophisticated target acquisition and weapons systems. Under the ALB-F concept, a typical battle or engagement is expected to be fought in four phases. Phase I (Sensor/Acquisition) will involve the sensory acquisition of the enemy forces. During Phase II (Fires), friendly units attack enemy formations with massive indirect fires to establish the conditions for Phase III (Maneuver), in which friendly maneuver units mass on and complete the destruction of the remnants of enemy forces. Upon completion of Phase III, maneuver units disperse and CSS operations surge to facilitate the recovery of the force during Phase IV (Recovery).[10]

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[9] "AirLand Battle Future Umbrella Concept," pp. 4-7.

[10] "Evolution of the Army: Using Concepts from AirLand Battle-Future," pp. 21-26.

Clearly, ground force agility will be critical during these last two phases. Consequently, the conduct of mobility operations, such as river crossings, will be extremely important. Under normal circumstances, the movement of combat forces over a river would be nothing more than an administrative activity if it were not for one significant factor: enemy opposition. Typically, the goal of a river crossing is to project combat power across a river faster than the enemy can mass opposing combat power. As one expert has suggested, "a river crossing is a race between a running hare and a swimming turtle."[11]

Unfortunately, the nonlinear battlefield of the future does not appear to be an environment which will be conducive to the survivability of any ***swimming turtles***. Because the critical phase of maneuver (Phase III) will be highly dependent on the agility of ground forces, mobility operations will assume an unprecedented priority for combat engineers. More specifically, the capability to conduct rapid, in-stride river crossings will be critical. Therefore, before considering how river crossings might be executed on the ALB-F battlefield, we should briefly consider what our current doctrine is and how it has evolved.

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[11]Phrase used by LTC R. Greenwalt, U.S. Army Engineer School, during a class on river crossing operations taught at Ft. Leavenworth on 3 August 1989.

U.S. ARMY RIVER CROSSING DOCTRINE

Classical military theorists and writers have long recognized the unique and dangerous nature of river crossing operations. Sun Tzu recommended, "after crossing a river you must move some distance away from it . . . when an advancing enemy crosses . . . allow half his force to cross and then strike."[12] Vegetius, in The Military Institutions of the Romans likewise wrote, "the passages of rivers are very dangerous without great precaution . . . it is necessary to secure both sides . . . so that the troops may not be attacked and defeated while separated by the channel of the river."[13]

Because river crossings create a vulnerability for the crossing force, classical writers have often recommended the use of surprise to offset this disadvantage. Frederick the Great suggested that: "a crossing demonstration is made at an entirely different locality to draw the enemy, and while he takes the bait, you build your bridges with all rapidity."[14] In a similar vein, Jomini tells us, "the passage of a large river . . . is an operation worthy of the closest study . . . it is

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[12]Sun Tzu, The Art of War, translated by Samuel B. Griffith (New York: Oxford University Press, 1963), p. 116.

[13]Flavius Vegetius Renatus, The Military Institutions of the Romans, translated by LT John Clarke in The Roots of Strategy, edited by BG T. R. Phillips (Harrisburg, PA: Stackpole Books, 1985), pp. 137-138.

[14]Frederick the Great, The Instructions of Frederick the Great to His Generals, in The Roots of Strategy, edited and translated by BG T. R. Phillips (Harrisburg, PA: Stackpole Books, 1985), p. 364.

essential to deceive the enemy as to the point of passage, that he may not accumulate an opposing force there."[15] Finally, Clausewitz offers the following:

> A major river that cuts across the line of attack is a great inconvenience to the attacker . . . if he intends to offer a decisive battle on the far side, or if he expects the enemy to attack him, he will expose himself to grave danger. So no general will place himself in such a position unless he can count on substantial moral and material superiority . . . If the attacker is stronger and eager to strike a major blow, he can make a diversion at one point while he crosses at another.[16]

A review of American river crossing doctrine reveals that the nature of river crossings has changed little since the classical theorists wrote. What has changed in recent years is the focus of U.S. Army river crossing doctrine. In general, it can be argued that our river crossing doctrine has evolved from being primarily terrain oriented to what it is today, a more force oriented doctrine.

After WWI, American river crossing doctrine was primarily focused on the technical aspects of crossing river obstacles. The Engineer Field Manual of 1918 contains 110 pages of information ranging from technical bridge design criteria to selection of construction

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[15]Antoine Henri Jomini, The Art of War, translated by BG J. D. Hittle, in Book II, The Roots of Strategy (Harrisburg, PA: Stackpole Books, 1987), pp. 516-517.

[16]Carl von Clausewitz, On War, edited and translated by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), pp. 532-533.

materials and construction techniques.[17] By 1941, however, a doctrinal shift had taken place which clearly recognized the need to overcome enemy defenses: "The immediate purpose is to get across quickly and economically and establish a bridgehead which will protect the crossing of the remainder of the command."[18]

Between 1941 and 1978, little changed; the 1978 doctrine represented nothing more than a continued refinement of the 1941 doctrine. By 1978, greater emphasis was placed on threat analysis and river crossings were now subdivided into three *types*: hasty, deliberate, and retrograde. In addition, three distinct crossing *stages* were recognized: assault, rafting, and bridging. Nevertheless, the 1978 doctrine remained bridgehead, or terrain oriented, and was divided into four distinct crossing *phases*: Advance to the River, Assault Crossing of the River, Advance from the Exit Bank, and Securing the Bridgehead.[19]

The 1990 FM 90-13 has introduced a doctrinal shift which is noteworthy. Although past doctrine has addressed tactical objectives to eliminate direct fires

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[17]U.S. Army, Engineer Field Manual, Professional Papers of the Corps of Engineers, No. 29, (Washington, D.C.: U.S. Government Printing Office, 1918), pp. 153-263.

[18]U.S. Army, Field Service Regulations, Field Manual 100-5, Operations, (Washington, D.C.: U.S. Government Printing Office, 22 May 1941), para. 815, pp. 193-194.

[19]U.S. Army, Field Manual 90-13, River Crossing Operations, (Washington, D.C.: U.S. Government Printing Office, 1978), p. 3-6.

(Exit Bank Objective) and observed indirect fires (Intermediate Objective), the idea of establishing a linkage with a tactical objective (Final Objective) outside the bridgehead line is new. As if to emphasize this point, the new manual redefines the river crossing phases: Advance to the River, Assault, Buildup, Consolidation, and Attack out of the Bridgehead. The last three phases differ in both name and overall purpose from the phasing in the 1978 doctrine since they are clearly oriented on the mission beyond the bridgehead.[20]

Another addition to the new manual are six *Crossing Fundamentals* which characterize all successful river crossings: Surprise, Extensive Preparation, Flexible Plan, Traffic Control, Organization, and Speed. The utility of these fundamentals as a part of our river crossing doctrine is twofold. First, they function as a link to river crossing fundamentals discussed in theory, as shown above. Second, they provide a useful set of criteria for evaluating river crossing operations in general.[21]

For our purposes, the six fundamentals will assist us in evaluating American river crossing doctrine vis-a-vis AirLand Battle Future. However, before we

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[20]The chart in ANNEX A schematically demonstrates how the new crossing phases, crossing stages (assault, raft, bridge), and tactical objectives are linked.

[21]Because the six fundamentals also provide a useful overall conceptual framework for what a river crossing looks like, I have included them as ANNEX B.

look to ALB-F, it is important to understand the command and control and assets required to conduct a typical division river crossing operation.

In general, the planning and command and control of river crossing operations is a division level function under the guidance of an assistant division commander often referred to as the *Crossing Force Commander*. Generally, an individual crossing area (one to three centerlines) can cross one heavy divisional brigade at a time. Therefore, the actual execution of river crossings is normally conducted by the brigade crossing through the crossing area at a given time (usually under the brigade executive officer, designated the **Crossing Area Commander**), and controlled by division. A division conducting a river crossing will either cross through a single crossing area, one brigade at a time (narrow front) or through several crossing areas simultaneously (broad front).

Although doctrinally this is how river crossings are conducted, there is an important link between doctrine and how much and where bridging assets are located in the force structure. In this regard, the Engineer School has developed several useful rules of thumb which help to illuminate this issue. First, organic divisional river crossing assets are generally capable of crossing only a single Task Force (opposed)

or a single brigade (unopposed).[22] Further, to cross a single brigade (opposed), a corps float bridge company per 100 meters of river width is needed.[23] To cross an entire division (opposed) will require an equal number of corps float bridge companies multiplied by the number of crossing areas desired.[24]

Obviously, a division requires bridging resources from corps engineers to conduct anything less than a minor river crossing. Depending on how doctrine is developed and how the current force is restructured, this could prove to be a constraint on mobility in an ALB-F scenario. Therefore, it is now useful to consider how river crossing operations might be conducted on the future battlefield.

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[22]Each heavy divisional engineer battalion has a float bridge company capable of constructing 148 meters of MLC 60 ribbon bridge. From U.S. Army, Field Manual 5-34, Engineer Field Data, (Washington, D.C.: U.S. Government Printing Office, 14 September 1987), p. 7-5.

[23]Each corps float bridge company is capable of constructing 215 meters of MLC 60 ribbon bridge (Ibid).

[24]These rules of thumb were addressed in a class on river crossing operations taught by LTC R. Greenwait, U.S. Army Engineer School, at Ft. Leavenworth on 3 August 89.

RIVER CROSSINGS ON THE ALB-F BATTLEFIELD

Traditionally, NATO exercises such as REFORGER, have emphasized early major crossings of the Rhine and Main Rivers to deploy divisions into a see-saw conflict oriented on restoration of the IGB following a ground assault by Warsaw Pact forces. The lack of operational depth and political constraints in Europe have tended to create a defensive orientation which has, in turn, caused us to view major river crossing operations as subordinate to an overall linear, *layer cake* defense. Undoubtedly, the conditions expected on the ALB-F battlefield will force us to reconsider how future river crossing operations will be conducted.

Having examined the general nature of the ALB-F battlefield and current river crossing doctrine, we are left with several important considerations. First, the ALB-F battlefield will be fraught with targeting and killing systems of astonishing proportions, making survivability a function of mobility and dispersion. Second, the increased nonlinearity of the battlefield will prompt the commanders of both sides to assume a greater orientation on the opposing force, vice a terrain orientation. Therefore, the focus will clearly be more offensive, at least at the tactical level. As a result, friendly force agility and mobility will be significantly more important than ever before. The ability to rapidly project combat power across riverine

obstacles will be essential.

Future commanders will continue to be strongly oriented on reducing their own force's vulnerability while enhancing the vulnerability of the enemy. On the ALB-F battlefield, however, vulnerability reduction more than ever will be a function of minimizing force concentration in both time and space. Because river crossing operations naturally result in a temporary concentration of forces in a bridgehead, they automatically create a force vulnerability which may not be tolerable on the future battlefield.

As discussed previously, under current river crossing doctrine, heavy divisional forces generally must mass while passing through a brigade bridgehead. Crossing assets tend to be centralized in one division bridgehead consisting of one or two division crossing areas. Dispersed maneuver brigades must concentrate on the division crossing area(s) and pass through the division bridgehead prior to attacking the objective. This creates a prolonged vulnerability window which begins prior to the river crossing and extends into the objective.[25] Assuming that future enemy forces will have the same targeting and killing capabilities which we expect to have, traditional river crossing operations such as this will simply not be feasible.

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[25]ANNEX C provides a schematic of how a typical division river crossing as part of a division attack is conducted under current doctrine.

The ALB-F battlefield will demand that river crossings be more dispersed to maximize survivability. One means of doing this would be to decentralize crossing assets down to brigade level and form three separate bridgeheads. Because maneuver brigades would not have to concentrate on a division bridgehead, they could remain dispersed until concentrating on the objective. Consequently, the vulnerability window would be much smaller.[26] Further, a decentralized approach to river crossing operations generally supports the six river crossing fundamentals quite well. At this point, it is useful to consider how each fundamental would fit this model on the ALB-F battlefield.

Although deception planning and OPSEC will continue to be important, ***SURPRISE*** will be enhanced by the fact that several smaller crossings will not attract as much attention as a single large crossing. More important, a broad front crossing will not necessarily indicate the orientation of the main attack, since combat forces remain dispersed through the crossing and do not mass until they reach the objective.

Continual IPB, to include the maintenance of comprehensive terrain and hydraulic data bases, will be a key aspect of ***EXTENSIVE PREPARATION***. Assuming supporting forces are either organic or habitually associated support units, unity of effort will be enhanced.

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[26] ANNEX D illustrates these ideas schematically.

Such relationships will reduce the amount of detailed planning and rehearsals required, allowing for increased use of SOPs.

The need for a ***FLEXIBLE PLAN*** and ***TRAFFIC CONTROL*** will actually be simplified due to the effects of both the ***empty battlefield*** and decentralized crossing operations. A reduced troop density will make more routes available and reduce traffic congestion. Further, multiple crossing sites will allow for diversion from one bridgehead to another as required, maximizing flexibility.

The dispersed nature of the ALB-F battlefield will require greater decentralization in general, making organization for combat less complex overall. Similarly, ***ORGANIZATION*** will be less complex as river crossing operations become more decentralized. Not only will dispersion simplify traffic control, it will also significantly ease terrain management. Again, assuming support forces are organic or habitually associated, the need for ad hoc organizations to conduct crossing operations is reduced, increasing organizational simplicity.[27]

Finally, decentralized operations would appear to

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[27] An issue related to ***ORGANIZATION*** is command and control. As discussed on page 12, under present doctrine the ***Crossing Force Commander*** is usually an assistant division commander. The priority and emphasis currently ascribed to river crossings by having them commanded by a general officer should not be overlooked. The reason for employing such a high level command and control asset is simply because river crossing operations are intrinsically complex and prone to ***friction***. Therefore, anyone conducting decentralized river crossings, as discussed here, should give serious consideration to this fact.

enhance SPEED. Multiple crossing sites will allow friendly forces to cross simultaneously, and therefore more quickly. In addition, because friendly forces are not massed in a single bridgehead, the enemy will very likely wait to attack until friendly forces are massed just prior to reaching the objective.

Implied in this discussion is the idea that crossing assets and support forces (engineer, MP, chemical, ADA) would be decentralized down to brigade level on a permanent (organic) or habitual support basis. Although there are numerous advantages to this approach, decentralization is a potential detractor to both preparation and flexibility. For instance, decentralization can result in the inability to mass crossing assets, since stocks of reserve crossing equipment would either not be readily available or they would be spread across multiple crossing sites. Ultimately, overall force agility could be negatively affected.

Nevertheless, at this juncture, all we have is a theoretical model for how river crossings might be conducted on the ALB-F battlefield. Although it seems that a decentralized approach could have the greatest utility, it is important to test the model. To do this, we will turn to historical example.

RELEVANT HISTORICAL PRECEDENT

Because we are looking into the future at a projected battlefield which is largely shaped by, as yet undeveloped technologies, historical evidence must be viewed carefully. History simply cannot provide us with examples of a futuristic battlefield in which near real time, perfect intelligence and highly lethal conventional weapons force dispersion, mobility and speed to unprecedented levels. What history can provide, however, is a glimpse of how each of the six river crossing fundamentals, as applied to my proposed ALB-F river crossing model (ANNEX D), have proven themselves valid in the past. To do this, we will examine two historical examples of river crossing operations, viewed through the lens of the six fundamentals: Napoleon's crossing of the Danube in 1809 prior to the Battle of Wagram and Patton's crossing of the Rhine in 1945 with the 5th Infantry Division at Nierstein/Oppenheim.

NAPOLEON'S CROSSING OF THE DANUBE IN JULY 1809

The Danube Campaign of 1809 began with an April attack by the Austrian army under Archduke Charles on French forces in Bavaria under the temporary command of Napoleon's Chief of Staff, Marshal Berthier. After Napoleon arrived in theater to assume command from his flustered chief of staff, the Austrians were defeated

at the battles of Abensburg-Eckmühl near Ingolstadt, April 20-22. Defeated but not destroyed, Charles retreated along the north bank of the Danube toward Vienna while Napoleon moved on Vienna along the south bank (ANNEX E, page E-2). After seizing Vienna, Napoleon realized that he had to defeat Charles on the north bank to win the war.[28]

At this point, Napoleon mounted an ill-conceived crossing of the Danube to attack the Austrian army near the towns of Aspern-Essling. Failing to properly reconnoiter the disposition of the Austrian army, Napoleon believed Charles' forces to be well displaced to the north. Therefore, the French seized the lightly-garrisoned island of Lobau and proceeded to place a single bridge into the Mühlau salient (ANNEX E, page E-2). While Massena's IV Corps crossed into the bridgehead, Austrian sappers attacked the vital French bridge linking Lobau Island with the south bank with "waterborne missiles--fireships, logs and floating mills."[29] The inability to project combat power into the bridgehead quickly enough contributed to Napoleon's ultimate failure to hold the far shore against an unexpectedly strong Austrian force. Thus, the French were forced to

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[28]David G. Chandler, The Campaigns of Napoleon (New York: MacMillan Publishing Co., 1966), pp. 677-694.

[29]Ibid, p. 700.

withdraw two days later on April 22nd.[30]

For six weeks, Napoleon planned a second crossing of the Danube, only this time, the planning was much more exhaustive. Stockades were constructed to deflect floating missiles, a flotilla of gunboats patrolled the Danube, and Lobau Island was turned into a well-stocked garrison in preparation for follow-on operations. After increasing his artillery strength using captured Austrian guns, Napoleon allocated the bulk of his artillery to provide close support to his assault forces under Davout and Massena. To conceal these preparations, a French cavalry screen was set up to the south and east.[31]

In addition to these extensive preparations, Napoleon directed a rather sophisticated deception operation to confuse Charles as to the location of the main attack. On June 30th, an entire French division under Legrand conducted a feint into the old bridgehead while additional troops moved up to presage Napoleon's main effort into the Mühlau salient. At the same time, four "supporting" bridges were constructed on the northern end of Lobau Island in open view of the enemy. To further confuse the Austrian commander, a second feint was conducted north at Stadlau on July 2nd.[32]

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[30] Ibid, pp. 694-707.

[31] Ibid, pp. 708-709.

[32] Ibid, pp. 709-713.

Finally, after Napoleon had presented a picture of extensive activity to the north, he conducted his actual attack at 2:00 a.m. on July 5th from concealed positions along the eastern side of Lobau Island (ANNEX E, page E-3). Within five minutes, the first of four prefabricated bridges was across the Danube. By 5:00 p.m., Napoleon had nearly 188,000 men across and in contact with Charles' army of 155,000. For the next two days, the Battle of Wagram was fought and eventually won by the French.[33]

Although Napoleon's crossing of the Danube occurred nearly 200 years ago and appears to bear more similarities to a conventional river crossing operation than to an ALB-F river crossing, we can draw several interesting lessons. First, following the failed crossing and defeat at Aspern-Essling, the French employed ***EXTENSIVE PREPARATION*** prior to their second attempt in July. A well thought out and detailed plan supported by comprehensive reconnaissance and the prestockage of important matériel (bridging, ammunition, etc.) on Lobau Island was carried out. Further, as part of his preparations, Napoleon created a somewhat decentralized ***ORGANIZATION*** by reallocating artillery downward to provide close fire support to his assault forces. He also disbursed his sappers across

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[33] Ibid, pp. 714-732.

his front to support both the main effort and the deception plan.

SURPRISE was certainly maximized through the use of a well-orchestrated deception plan. By using his cavalry to screen certain aspects of his preparation, Napoleon was able to conceal his true intentions. At the same time, the construction of diversionary bridges and the execution of two feints prior to the main attack caused Charles and his staff to believe that the French would make a repeat attack into the Mühlau salient.

Although the extensive preparation and the deception operation certainly contributed to the ultimate success of the crossing, the use prefabricated bridges for the main effort went far to maximize ***SPEED***. In fact, the French preconstruction of their wooden pontoon bridges resulted in a rapid crossing of the main effort (5 minutes) which rivals our own ribbon bridging operations! More noteworthy, the fact the Napoleon chose to cross simultaneously through four bridges, versus the single bridge used previously in the Mühlau salient, significantly enhanced the rapidity of the overall crossing. In addition, the use of multiple crossing sites most certainly enhanced ***TRAFFIC CONTROL*** and allowed for a more ***FLEXIBLE PLAN*** since crossing operations were decentralized.

PATTON'S CROSSING OF THE RHINE IN MARCH 1945

One of the more controversial strategic issues of WWII centered on the Allied strategy to cross the Rhine River and attack into Germany (ANNEX F, page F-2). British planners strongly favored a single drive in the north under Field Marshal Montgomery's 21st Army Group. Instead, Eisenhower favored a broad-front strategy consisting of a main effort in the north which would cut across the North German Plain toward Berlin and a secondary effort south of the Rühr. For various reasons, the Supreme Commander eventually shifted his main effort to Bradley's 12th Army Group in the south. One factor which influenced Eisenhower to make this shift was the demonstrated boldness of his southern commanders to seize Rhine crossings at Remagen, Boppard, and Oppenheim, in comparison with the more methodical Montgomery in the north.[34]

A real concern of American commanders was their potential relegation to a supporting role, while Montgomery's 21st Army Group made the main effort in the north. Nevertheless, whatever Bradley's motivation, the 12th Army Group Commander was also planning on a hasty crossing of the Rhine for sound tactical reasons.

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[34]In addition, the successful Russian attack on Berlin, the concern over a German "National Redoubt" in southern Germany, and growing evidence that the Germans had moved much of their industrial capacity deeper into Germany were all reasons which eventually promoted Eisenhower to shift his main effort south. From The West Point Atlas of American Wars, Vol II: 1900-1953, ed. Vincent J. Escosito (New York: Praeger Publishers, 1959.), Map 67, WWII.

On 19 March, he told Patton to move his assault bridging stocks forward because, "I want you to take the Rhine on the run. We're not going to stop, give the other fellow a chance to build up and raise hell when we come across."[35] As might be imagined, this was all Patton needed to hear.

The best place to cross the Rhine in the 3rd Army sector was in the north, since that would alleviate the need to cross both the Rhine and Main Rivers. (ANNEX F, page F-3) However, since intelligence indicated that the Germans expected U.S. forces to cross downstream of Mainz, Patton opted to achieve surprise by making his main crossing south of Mainz at the villages of Nierstein and Oppenheim. Under the command of General Eddy's XII Corps, the 90th Infantry Division would conduct a feint at Mainz (location of the confluence of the Main and Rhine Rivers) while the 5th Infantry Division would conduct a hasty crossing at Nierstein/Oppenheim. The 5th Division would be followed by the 4th Armored Division which would conduct the subsequent breakout and exploitation past Frankfurt to seize a bridgehead over the Main River at Hanau.[36]

Despite the fact that this was to be a hasty crossing on the run, it was well planned and supported.

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[35]Omar N. Bradley, A Soldier's Story (New York: Henry Holt & Co., 1951), p. 519.

[36]Charles B. MacDonald, United States Army in World War II: The European Theater of Operations--The Last Offensive (Washington, D.C.: Office of the Chief of Military History, U.S. Army, 1973), pp.266-268.

In addition to the division's 7th Engineers, Patton allocated over 7,500 combat engineers: the 204th Engineer Battalion with over 500 assault boats and the 1035th Engineer Group to conduct bridging operations. In addition, Naval Unit 2 supplied LCVPs to assist in accelerating the buildup into the bridgehead. Further, two groups of corps and army artillery stood by to reinforce the division artillery; a total of thirteen artillery battalions.[37]

At 2200 on 22 March, the lead elements of the 11th Infantry Regiment began to cross in the initial assault. Despite the massive artillery support available, to maximize surprise, no preparatory fires were fired. The gamble paid off. By early afternoon on the 23rd, the entire division had been ferried across by assault boat, ferry, and LCVP. Two pontoon bridges were opened by late afternoon, allowing the bridgehead to expand to a radius of over five miles by late evening. The rapid establishment of an effective bridgehead prompted General Eddy to order the 4th Armored Division across early on the 24th to begin the exploitation.[38] To get a true picture of conditions in the bridgehead, the 5th Division Official history tells it best:

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[37]The Fifth Division Historical Section, Headquarters, Fifth Infantry Division, The Fifth Infantry Division in the ETO (Nashville, TN: The Battery Press, Inc., 1945), "Crossing the Rhine." and MacDonald, p. 268.

[38]MacDonald, pp. 270-272.

> It was because the buildup of the bridgehead was so fast and smooth that the crossing eventually proved to be so successful. The engineers set all sorts of records for speed in building Class 40 rafts and two bridges, a heavy pontoon and a treadway. The Navy kept its LCVPs constantly plying back and forth and a quartermaster company kept its DUKWs in constant operation in the shuttle of supplies and evacuation of the wounded . . . By this time the Rhine bridgehead had taken on the appearance of Normandy transplanted into Germany with beachmasters, bridgeheads dumps of ammunition and supplies, DUKWs, WEASELs, and LCVPs, pushing back and forth transporting ammunition and supplies to the assault troops pushing inland.[39]

Certainly one reason for the phenomenal success of the Nierstein/Oppenheim crossing was the sorry state of the German defenses on the far shore. German forces were stretched thin all along the Rhine, only concentrating on expected or known Allied crossing sites, such as Montgomery's major buildup at Wesel and 1st U.S. Army's seizure of the Ludendorff bridge at Remagen.[40] In addition, because the German XII Army Commander, General Felber, did not expect an attack south of Mainz, his only capability to stop such an attack lay with his meager reserve, the 159th Volks Grenadier Division, depleted down to four infantry battalions and two artillery batteries. Although 5th Division experienced a few pockets of resistance and a counterattack at midnight on March 23rd by a regimental-sized unit of

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[39] Fifth Division History, "Crossing the Rhine."

[40] A useful and readable overview of the Allied crossings of the Rhine can be found in Charles Whiting's book, Bounce the Rhine (New York: Stein and Day, 1985).

student officers from Wiesbaden, for the most part, German defenses were easily overcome.[41]

As with Napoleon's crossing in 1809, Patton's crossing of the Rhine was not done on an ALB-F battlefield. Nevertheless, the Nierstein/Oppenheim crossing offers some useful lessons for the future. First, as with Napoleon, 3rd Army ensured ***EXTENSIVE PREPARATION*** by weighting the crossing with overwhelming engineer and artillery support. Although these units were not necessarily organic or habitually supporting forces, nevertheless, Patton did employ a well tailored ***ORGANIZATION*** to ensure mission success.

In addition, 3rd Army employed a viable deception operation by having the 90th Division conduct a feint near Mainz where the Germans had weighted their main effort in expectation of Patton's primary crossing. Thus, ***SURPRISE*** was maximized and the 5th Division had only to defeat the weak German XII Army reserve, the 159th Volks Grenadier Division. Surprise was further enhanced by the fact that at this time, the German high command was focused on Montgomery's obvious buildup prior to crossing at Wesel and the bridgehead at Remagen.

It is instructive to note that although 3rd Army did not disperse and use multiple crossing sites, at a

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[41] MacDonald, p. 272.

higher level, the Allies achieved the same effect by attacking across a broad front up and down the Rhine. As a result, the weakened German defenders were unable to be strong everywhere and Patton was able to take advantage of the situation in his sector by seizing a relatively undefended bridgehead. In any case, all of these factors contributed to the ***SPEED*** with which 3rd Army was able to establish its bridgehead on the Rhine, opening the door to follow-on operations sooner than expected. Arguably, because the 5th Division met nominal resistance in the bridgehead and was able to expand it to a five mile radius within 24 hours of the initial assault, ***TRAFFIC CONTROL*** was simplified, even though multiple crossing sites were not used.

Although 3rd Army's crossing was not decentralized, at a higher level, the broad front strategy for crossing the Rhine and attacking into Germany by the Allies, proved to be a very ***FLEXIBLE PLAN***. This strategy allowed Eisenhower to exploit success when and where it developed. Had he been swayed by the British desire to heavily weight the main effort to the north, it is likely that the forces and crossing assets would not have been available to take advantage of the weakened German condition in the south.

Both of these examples validate the importance of the six river crossing fundamentals and provide insight into how they might be applied on a nonlinear battlefield. The bottom line for future commanders will be

knowing how to employ all of the fundamentals in concert to reduce their own force's vulnerability prior to reaching the final objective. However, an interesting point to consider is that although neither example disproves the suitability of decentralized river crossing operations, both examples point to at least one key advantage of centralized river crossings. Specifically, both Napoleon and Patton were able to effectively shape their operational schemes by appropriately applying centrally-controlled crossing assets. Because they controlled the majority of their forces' crossing assets, they had greater flexibility to apply those assets in accordance with their operational plans. All of these lessons from history must be considered as we now consider doctrinal and force structure implications.

DOCTRINAL AND FORCE STRUCTURE IMPLICATIONS

So far, we have examined U.S. river crossing doctrine and found that, with the 1990 version of FM 90-13, River Crossing Operations, our doctrine has made a decided shift toward being more force, rather than terrain oriented. The change is emphasized by the new phasing of river crossing operations. The last three phases (Buildup, Consolidation, Attack out of the Bridgehead) are now clearly focused on operations beyond the bridgehead and not merely on the retention of the bridgehead itself. Because the ALB-F concept is primarily oriented on the destruction of the enemy forces, our current doctrine should be functional in an ALB-F scenario.

Thus, to apply current doctrine to my proposed model for more decentralized river crossing operations on the ALB-F battlefield would probably require few changes. As described in this paper, the six river crossing fundamentals remain valid for river crossings on the ALB-F battlefield. Nevertheless, there is always a close tie between doctrine and force structure. Therefore, the question to be investigated at this point is whether current and proposed future force structure will adequately support ALB-F river crossing operations.

The U.S. Army Engineer School has been wrestling with doctrinal and forces structure issues concerning

how engineers can best support AirLand Battle for over ten years. The E-Force concept of assigning one combat engineer battalion per maneuver brigade has generally been accepted by the combat arms community as the optimum means of providing combat engineer support to the heavy division. Using corps mechanized combat engineer battalions, an ad hoc E-Force organization has been established in the heavy divisions in Europe over the last eight years with great success.

With the advent of the ALB-F concept, the Engineer School has found it necessary to refine the original E-Force design only slightly. Under ALB-F, each heavy divisional maneuver brigade will be supported by an organic engineer battalion consisting of an HHC and three combat engineer companies of two platoons each. At division, a regimental engineer (O-6), with a 19-man cell, would provide overall, division-level engineer planning as well as an initial interface with supporting engineer assets from corps. In addition, all bridging assets would be centralized at corps. In general, therefore, the trend is to decentralize combat engineer assets to the maneuver brigades while centralizing specialized engineering assets, such as bridge and combat support equipment companies, at corps level.[42]

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[42]ANNEXES G and H display the comparison between Army of Excellence (AOE) and proposed AirLand Battle-Future force structures for the Corps Engineer Brigade and the Heavy Divisional Engineer Battalion, respectively.

At first glance, the idea of removing the divisional ribbon bridge company and further centralizing all assault float bridging assets at corps level seems to be a move in the wrong direction. It violates the proposed idea of decentralized river crossing operations on the ALB-F battlefield. This, in fact, was my initial sentiment before writing this monograph. As we look at history, however, it is difficult to ignore the fact that by centralizing bridging assets, commanders like Napoleon and Patton had more flexibility to shape their operational plan. The result was that force agility was maximized at the critical place and time.

In general, two viable approaches exist for achieving this flexibility: (1) central control of assets with decentralized execution or (2) centralized control of assets and centralized execution. In the first instance, corps would provide bridging assets to maneuver divisions and brigades as required and brigades would conduct decentralized river crossing operations as already discussed. In the second case, corps would retain all bridging and execute bridging operations for maneuver elements.[43]

Under the first approach, although each brigade would not have its own organic bridging assets, the

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[43]Although I take full responsibility for any and all flaws in these ideas, I shaped them in my own mind partly through discussions with MAJ Gerry Hopkins, Center for Army Tactics, U.S. Army Command and General Staff College, Ft. Leavenworth, Kansas and MAJ Joe Seerley, Force Design Branch, Concepts/Studies Division, Directorate of Combat Developments, U.S. Army Engineer School, Ft. Leonard Wood, Missouri.

proposed ALB-F engineer force structure would provide an organic engineer planning headquarters at both brigade and division level. Supporting bridging assets would still be supplied by corps for brigade-level operations. Therefore, the ***SPEED*** and ***SURPRISE*** to be achieved by decentralized river crossings would not be lost, just as they were not lost to Patton at the Nierstein/Oppenheim crossing.

Of course, organic bridging assets in each brigade would be ideal. But the existence of an engineer command and control headquarters at brigade to which bridge units would be attached in a supporting role, would still go far to enhance unity of effort. Organic engineer headquarters at both brigade and division level would greatly assist in providing the ***EXTENSIVE PREPARATION*** needed to plan and conduct successful river crossing operations. Corps assault float bridge companies would simply be "plugged in" to the brigade engineer battalion in a tailored, building-block approach, as required. With this approach, ***ORGANIZATION*** of river crossing operations would be made more simple and certainly more manageable than they are today. Further, as Napoleon experienced at the battle of Wagram, decentralized river crossings would only enhance a more ***FLEXIBLE PLAN*** and further simplify ***TRAFFIC CONTROL***.

The second approach carries the concept of centralization one step further, whereby river crossing operations would be completely planned and executed by

corps. In effect, bridging task forces would be responsible for moving independently in advance of maneuver units to rapidly construct bridges just prior to the arrival of crossing forces. Once maneuver elements are across, bridging task forces remove the bridging, disperse, and possibly redeploy to establish egress crossing sites elsewhere for the dispersing maneuver brigades. In effect, these corps bridge task forces would function independently on the dispersed battlefield, responding to various missions to establish bridgeheads for moving maneuver brigades.[44]

Assuming corps would be able to synchronize the operations of bridge task forces and maneuver units, this concept has great utility. For all of the reasons discussed above, ***SPEED, SURPRISE, EXTENSIVE PREPARATION, ORGANIZATION, FLEXIBLE PLAN*** and ***TRAFFIC CONTROL*** would be nearly optimized. The only significant disadvantage would be that if synchronization broke down (such as in the event of unexpectedly strong enemy opposition), maneuver brigades would be limited in their ability to cross independently and mission failure could be catastrophic. Nevertheless, the high payoff of such a centralized approach requires that it be considered.

During the REFORGER 88 exercise, CERTAIN CHAL-

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[44] ANNEX I depicts a schematic of this concept.

LENGE, the 565th Engineer Battalion, the only active component bridge battalion in the U.S. Army, had the opportunity to test some of these concepts. The 565th Engineer Battalion is a corps bridge battalion, consisting of three assault float bridge companies and a medium girder bridge company. During CERTAIN CHALLENGE, divisional float bridge companies were attached to the 565th, allowing the battalion to function as the primary command and control headquarters for 7th (U.S.) Corps assault float bridge operations. In the course of the exercise the 565th learned some valuable lessons.[45]

First, "corps-level bridging assets offer the corps commander (flexibility) in influencing the battle."[46] The fact that the 565th Engineers' bridging was centralized, allowed the 7th Corps commander to decide when and where to weight the corps battle with river crossing assets. Further, the importance of "battalion-level command and control . . . for corps-level bridge companies" and the fact that "maneuver units require river crossing expertise" were two additional lessons learned.[47] Although the author was emphasizing the need for a corps bridge battalion headquarters to provide this command and control and

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[45] Lieutenant Colonel Paul G. Munch, "The Engineer Bridge Battalion," Engineer, 20 (March 1990), 13-18.

[46] Ibid, p. 16.

[47] Ibid, pp. 16-17.

expertise in an AirLand Battle scenario, the point is still useful. On the dispersed ALB-F battlefield, the necessary command and control and expertise would be provided by either the organic brigade engineer headquarters or engineer bridging task forces.

Clearly, it would seem that the efforts being made by the Engineer School in structuring the engineer force to meet the challenges of the ALB-F battlefield are on target. Nevertheless, a potential weakness still remains. Whereas in the past we always had adequate bridging assets to function in the limited area of Western Europe, the offensive nature of ALB-F will likely require a much greater quantity of both assault and lines of communication (LOC) bridging assets in the force structure.

A 1965 Soviet study demonstrated that in the European Theater, Soviet forces would encounter a 100 meter wide water obstacle every 35-60 kilometers, a 100-300 meter wide water obstacle every 100-150 kilometers, and a 300+ meter wide water obstacle every 250-300 kilometers.[48] If we accept these figures, then we can calculate that a brigade making a 150 kilometer attack during Phase III (Maneuver) of an ALB-F scenario, will encounter up to 700 meters of water obstacles (four 100 meter-wide and one 300 meter-wide). Using

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[48]U.S. Army, Field Manual 100-2-2, The Soviet Army: Specialized Warfare and Rear Area Support, (Washington, D.C.: U.S. Government Printing Office, 16 July 1984), p. 6-1.

the Engineer School rules of thumb discussed earlier, a brigade crossing up to 700 meters of water obstacles (opposed) will require the support of seven corps ribbon bridge companies. Currently, only six corps ribbon companies are planned for a typical four-division heavy corps. (See ANNEX G) Assuming there will be more than one brigade attacking out of the corps' four divisions, separate heavy brigade and armored cavalry regiment, clearly a shortfall in bridging assets would exist.

Another potential force structure shortfall could be in follow-on float and fixed bridging to replace assault float bridging. Despite the nonlinearity of the future battlefield, there will still be a need for a certain amount of LOC bridging to follow combat forces. During WWII, the 15th Army Group noted that "it was of paramount importance to replace divisional crossings rapidly with good two-way bridges."[49] Recently, the 20th Engineer Brigade likewise noted during Exercise GALLANT EAGLE 82 that "because of the length of MSRs and the large number of bridges, the single MGB company could not maintain or construct sufficient bridges to keep MSRs open . . . additionally, alternate bridging must be used for gaps over 30 meters."[50]

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[49]Center for Army Lessons Learned, Observation Report 1195, provided by 15th Army Group, 1945.

[50]Center for Army Lessons Learned, Observation Report 382, provided by 20th Engineer Brigade, 1982.

Unless augmented by corps engineer battalions to emplace Bailey and nonstandard fixed bridging along LOCs, the six MGB companies per corps will quickly become overwhelmed. It is interesting to note that during CERTAIN CHALLENGE, the 565th Engineer Battalion learned for similar reasons that "the battalion's tactical fixed bridge assets (MGB) are insufficient."[51] The important point here is that the absence of follow-on LOC bridging can have two negative impacts on the ALB-F commander. First, without LOC bridging available to replace assault float bridges, you will quickly run out of ribbon bridge--an asset you cannot afford to leave floating in various rivers around the battlefield. Second, the inability to maintain viable LOCs open and flowing with sustainment support, will quickly result in the withering of one's combat assets.

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[51] Munch, p. 17.

CONCLUSIONS AND RECOMMENDATIONS

With the publication of the 1990 version of FM 90-13, our river crossing doctrine has taken a significant step forward toward relevancy in the future. By being more force, vice terrain oriented, it is in step with the emerging trends of future warfare, particularly AirLand Battle Future. Nevertheless, some minor adjustments will be necessary.

Assuming that the future battlefield unfolds as predicted, we will have to conduct river crossings in a more decentralized manner than our doctrine and force structure would allow us today. Instead of divisional bridgeheads, river crossings will have to be conducted at no higher than brigade level. By crossing along a broader front, our forces will be able to maximize both ***SPEED*** and ultimately ***SURPRISE***. More important, by not creating an extensive window of vulnerability, friendly force survivability is maximized.

Although river crossings themselves will be decentralized, it seems clear that, in order to retain tactical and operational flexibility, the corps commander should retain centralized control over his limited bridging assets. Two techniques were discussed for doing this: (1) distribute bridging resources to maneuver elements as required or (2) retain all bridging and conduct corps-level assault float bridging operations for maneuver brigades. Either approach is

feasible, depending on the normal tactical considerations of METT-T (mission, enemy, terrain, troops, and time available) and the personal inclination of the corps commander. In either case, current doctrine would have to be adjusted to reflect both of these approaches.

Of equal importance, however, is the need to seriously evaluate force structure requirements to support river crossings on the ALB-F battlefield. Although it was not the purpose of this paper to make this analysis, clearly, this must be done. We are emerging from a doctrine which was limited by the political/terrain constraints of NATO and now look to a future doctrine which foresees tremendous mobility across potentially vast distances. Should the ALB-F, nonlinear battlefield become a reality, we could run out of assault and LOC bridging for our heavy divisions very quickly. Should this happen, our doctrine, no matter how good it is, will be of little utility.

BIBLIOGRAPHY

BOOKS

Bellamy, Chris. The Future of Land Warfare. New York: St. Martin's Press, 1987.

de Bloch, Jean. The Future of War in its Technical, Economic, and Political Relations. Translated by R.C. Long. Boston: Doubleday & McClure Co., 1899.

Bradley, Omar N. A Soldier's Story. New York: Henry Holt & Co., 1951.

Chandler, David G. The Campaigns of Napoleon. New York: MacMillan Publishing Co., 1966.

Clausewitz, Carl von. On War. Edited and translated by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1984.

Esposito, Vincent J., editor. The West Point Atlas of American Wars. 2 volumes. New York: Praeger Publishers, 1959.

Flavius Vegetius Renatus. The Military Institutions of the Romans. Translated by Lt John Clarke and edited by BG T. R. Phillips in The Roots of Strategy, pp. 65-175. Harrisburg, PA: Stackpole Books, 1985.

Fifth Infantry Division Historical Section. The Fifth Infantry Division in the ETO. Nashville, TN: The Battery Press, Inc., 1945.

Frederick the Great. The Instructions of Frederick the Great to His Generals. Edited and translated by BG T. R. Phillips in The Roots of Strategy, pp. 301-400. Harrisburg, PA: Stackpole Books, 1985.

Giles, Janice Holt. The Damned Engineers. Boston: Houghton Mifflin Company, 1970.

Griess, Thomas E., editor. Atlas for the Wars of Napoleon (The West Point Military History Series). Wayne, New Jersey: Avery Publishing Group, Inc., 1986.

_____. Atlas for the Second World War: Europe and the Mediterranean (The West Point Military History Series). Wayne, New Jersey: Avery Publishing Group, Inc., 1986.

Jomini, Antoine Henri. The Art of War. Translated by BG J. D. Hittle in The Roots of Strategy, Book II, pp. 389-557. Harrisburg, PA: Stackpole Books, 1987.

MacDonald, Charles B. United States Army in World War II: The European Theater of Operations--The Last Offensive. Washington, D.C.: Office of the Chief of Military History, U.S. Army, 1973.

Pergrin, David E. First Across the Rhine. New York: Atheneum, 1989.

Sun Tzu. The Art of War. Translated by Samuel B. Griffith. New York: Oxford University Press, 1963.

Weigley, Russell F. Eisenhower's Lieutenants. Bloomington, IN: Indiana University Press, 1981.

Whiting, Charles. Bounce the Rhine. New York: Stein and Day, 1985.

PERIODICALS AND ARTICLES

Christman, Daniel W. and Richard C. Herrick. "The Engineer Future in Europe." The Military Engineer, vol. 82, no. 538 (September-October 1990), pp. 37-41.

Munch, Paul G. "The Engineer Bridge Battalion." Engineer, 20 (March 1990), 13-18.

Schneider, James J. "The Theory of the Empty Battlefield." In RUSI Journal of the Royal United Services Institute for Defence Studies, (Summer 1987), pp. 37-44.

GOVERNMENT DOCUMENTS, MANUALS AND LECTURES

Arnold, Edwin J. Jr. AMERICAN RIVER CROSSING DOCTRINE: A Look at its Compatibility with Current Force Structure and the Modern Battlefield. Fort Leavenworth, Kansas: SAMS Monograph, 1985.

Center for Army Lessons Learned. "Observation Report 1195" by 15th Army Group, 1945.

Center for Army Lessons Learned. "Observation Report 382" by 20th Engineer Brigade, 1982.

Greenwalt, Robert. Class given on U.S. Army river crossing operations, Ft. Leavenworth, Kansas, 3 August 1989.

U.S. Army. "Evolution of the Army: Using Concepts from AirLand Battle-Future." Fort Leavenworth, Kansas: Unpublished document developed by the Concept and Force Alternatives Directorate, Combined Arms Combat Developments Agency (CACDA), U.S. Army Combined Arms Center (CAC), Final Coordinating Draft, 11 September 1990.

_____. "AirLand Battle-Future Umbrella Concept," TRADOC 525-XX. Fort Leavenworth, Kansas: Unpublished document developed by the Concept and Force Alternatives Directorate, Combined Arms Combat Developments Agency (CACDA), U.S. Army Combined Arms Center (CAC), Draft as of 31 August 1990.

_____. Engineer Field Manual. Professional Papers of the Corps of Engineers, No. 29. Washington, D.C.: U.S. Government Printing Office, 1918.

_____. Field Manual 5-34, Engineer Field Data. Washington, D.C.: U.S. Government Printing Office, 14 September 1987.

_____. Field Circular 90-13, Counterobstacle and River Crossing Operations. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, March 1987.

_____. Field Manual 90-13, River Crossing Operations. Washington, D.C.: U.S. Government Printing Office, 1 November 1978.

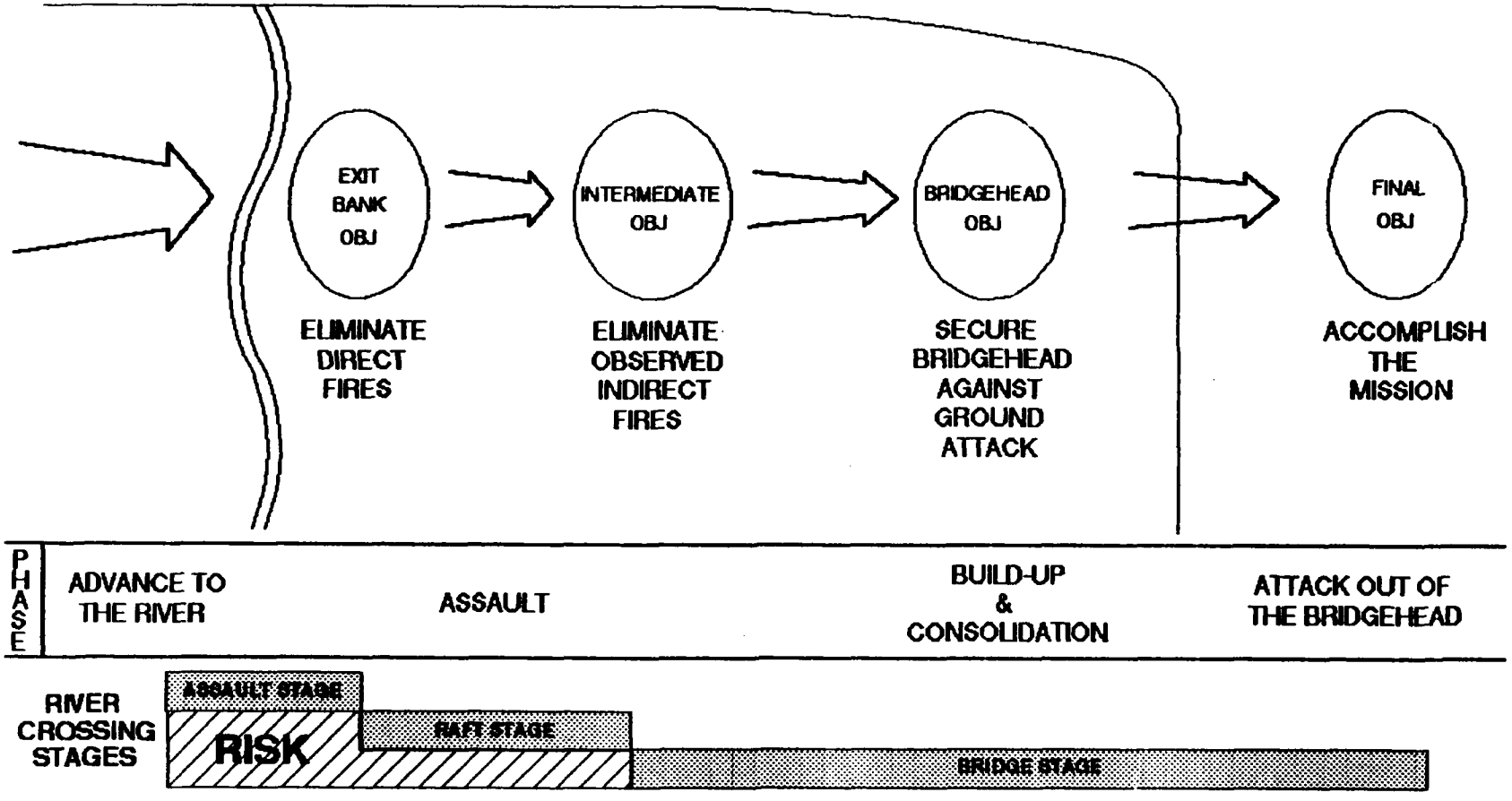
_____. Field Manual 90-13, River Crossing Operations. Washington, D.C.: U.S. Government Printing Office, July 1990.

_____. Field Manual 100-5, Operations. Washington, D.C.: U.S. Government Printing Office, 5 May 1986.

_____. Field Manual 100-2-2, The Soviet Army: Specialized Warfare and Rear Area Support. Washington, D.C.: U.S. Government Printing Office, 16 July 1984.

_____. Field Service Regulations, Field Manual 100-5, Operations. Washington, D.C.: U.S. Government Printing Office, 22 May 1941.

ANNEX A
OFFENSIVE RIVER CROSSING



SOURCE: FM 90-13, "River Crossing Operations," July 1990, pp. 4-1 to 4-10

ANNEX B

RIVER CROSSING FUNDAMENTALS

SURPRISE

The range and lethality of modern weapons allows even a small force to defeat a larger one exposed in an unfavorable position. A river provides this possibility by channeling a force through a small number of crossing sites, splitting its combat power on separate banks, and exposing units on the water. Surprise minimizes these disadvantages; forces that fail to achieve surprise may also fail in the crossing attempt.

A deception plan is a key element of surprise. It reinforces the Threat's predisposition to believe that the force will take a particular course of action. The Threat usually expects a crossing. A deception plan that employs reconnaissance, site preparations, force build-up, and preparatory fires at a time or location other than the intended crossing area may delay an effective Threat response to the true crossing.

The usual operations security (OPSEC) measures are also important. Commanders enforce camouflage, noise, thermal, electromagnetic, and light discipline. Force deployment avoids predictable patterns. In particular, commanders closely control movement and concealment of river crossing equipment and other obvious river crossing preparations. Despite modern intelligence-gathering technology, the skillful use of night, smoke, fog, and bad weather is still effective.

EXTENSIVE PREPARATION

Comprehensive intelligence of Threat defenses and crossing-area terrain must be developed early, since planning depends on an accurate and complete intelligence picture. Reconnaissance and intelligence development are vital first steps in preparing for a crossing operation.

Supporting forces, which typically include engineer battalions, bridge companies, air defense batteries, smoke generation companies, and military police (MP) companies, like up early. They immediately begin crossing preparations and are available to train the crossing force during rehearsals. Their prompt alert and movement is critical.

Commanders plan and initiate deceptive operations early to mask the actual preparation. These operations should conceal both the time and location of the crossing, so they begin before and continue throughout the preparation period.

Work necessary to improve routes to handle the crossing operation's traffic volume should occur early enough not to inter-

fere with other uses of the routes. This requires a detailed plan carefully synchronized with the deception plan.

Rehearsals are essential to clarify roles and procedures, train personnel, inspect equipment, develop teamwork, and ensure unity of effort. Only obstacle breaching requires more intense rehearsal than river crossing.

FLEXIBLE PLAN

Even successful crossings seldom go according to plan. A flexible plan enables the crossing force to adapt rapidly to changes in the situation during execution. It allows the force to salvage the loss of a crossing site or exploit a sudden opportunity. A flexible plan for a river crossing is the result of deliberate design, not chance. Such a plan features:

- Multiple approach routes from assembly areas to crossing sites.
- Lateral routes to switch units between crossing sites.
- Secondary crossing sites and staging areas to activate if Threat action closes the primaries.
- Stocks of crossing equipment held in reserve to replace losses or open alternate sites.

TRAFFIC CONTROL

The river is a significant obstacle that slows and stops units, thus impeding their ability to maneuver. They are restricted to moving in column formations along a few routes that funnel together at the crossing sites. Control is essential to cross units at the locations and in the sequence desired. It achieves maximum crossing efficiency and prevents the formation of targets susceptible to destruction by artillery or air strikes. In addition, effective traffic control contributes to the flexibility of the plan by enabling commanders to change the sequence, timing, or site of crossing units. The traffic-control organization can switch units over different routes or hold them in assembly areas as directed by the tactical commander.

ORGANIZATION

Commanders use the same command and control nodes for river crossings as they do for other operations. These nodes, however, take on additional functions in river crossings. For this reason, commanders specify which nodes and staff positions have specific river crossing planning and control duties. This may require some temporary collocation of headquarters cells (or individual augmentation) and an increase in communications means.

The commander organizes support forces consisting of engineer, communication, MP, chemical, and other elements into a

crossing organization. This organization reports to his controlling headquarters. Since this is a temporary grouping, procedures established by the control headquarters must be clear, simple, and rehearsed by all elements to ensure responsive support of the plan and unity of command.

Terrain management is an integral part of the crossing organization. The controlling headquarters assigns space for support forces to work and for assault forces to concentrate before crossing. Otherwise, they interfere with each other and become lucrative targets for conventional, chemical, and nuclear fires.

SPEED

A river crossing is a race between the crossing force and the Threat to mass combat power on the far shore. The longer the force takes to cross, the less likely it will succeed, as the Threat will defeat in detail the elements split by the river. Speed is so important to crossing success that extraordinary measures are justified to maintain it. The commander must allow no interference with the flow of vehicles and units once the crossing has started.[52]

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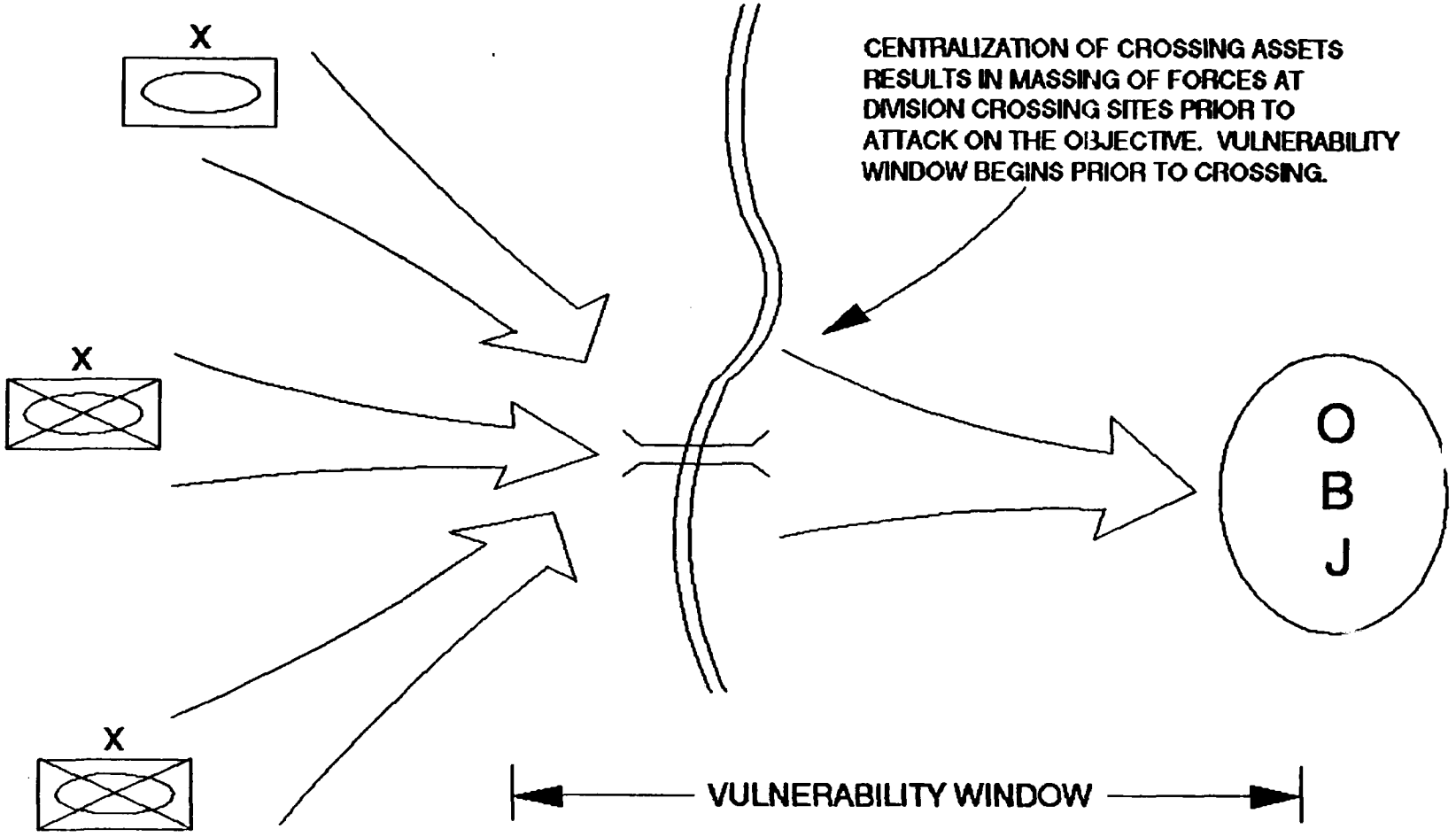
[52] U.S. Army, Field Manual 90-13, River Crossing Operations, (Washington, D.C.: U.S. Government Printing Office, July 1990), pp. 1-2 to 1-3.

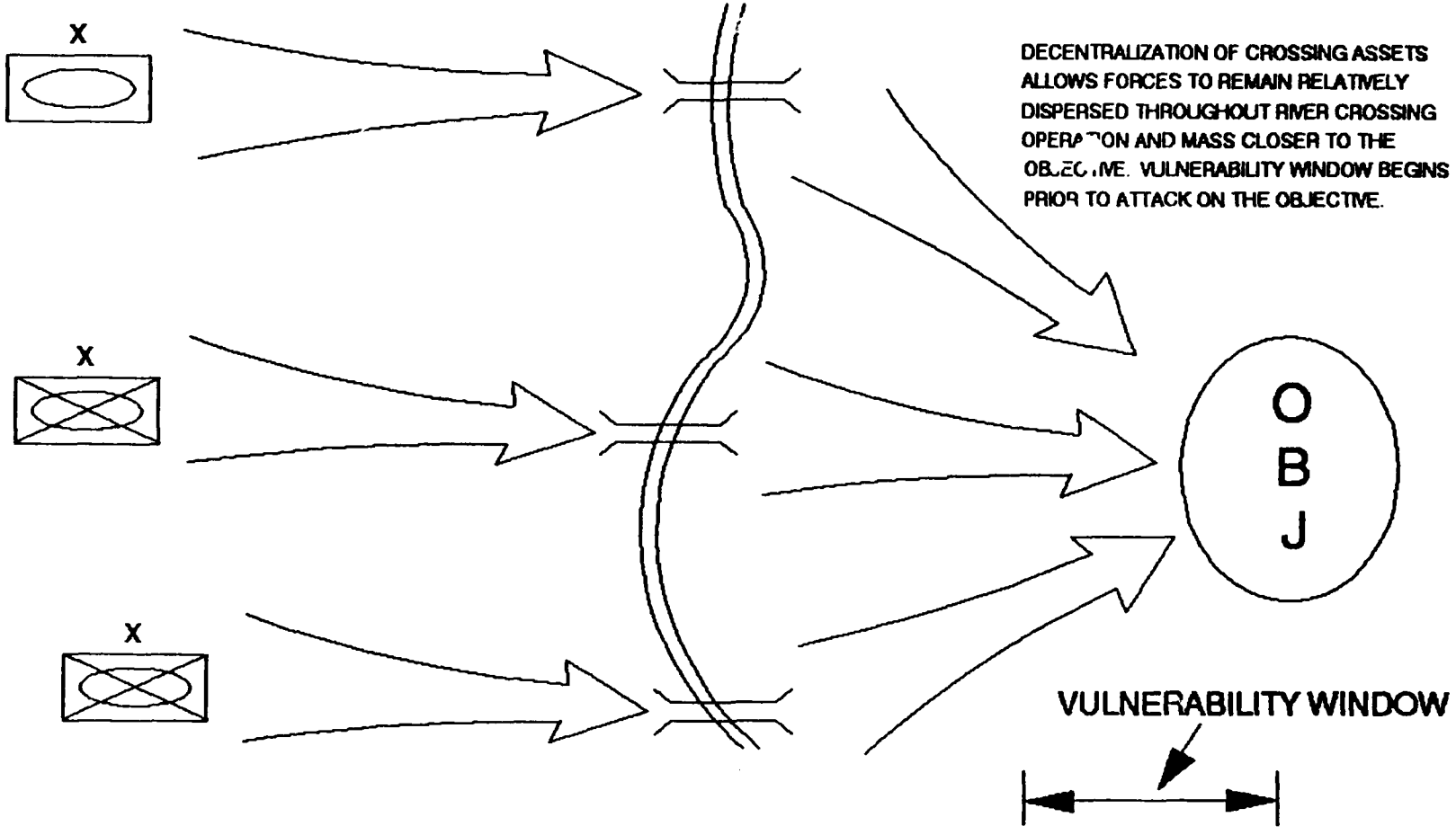
ANNEX C

DIVISION RIVER CROSSING: CURRENT DOCTRINE



ANNEX D

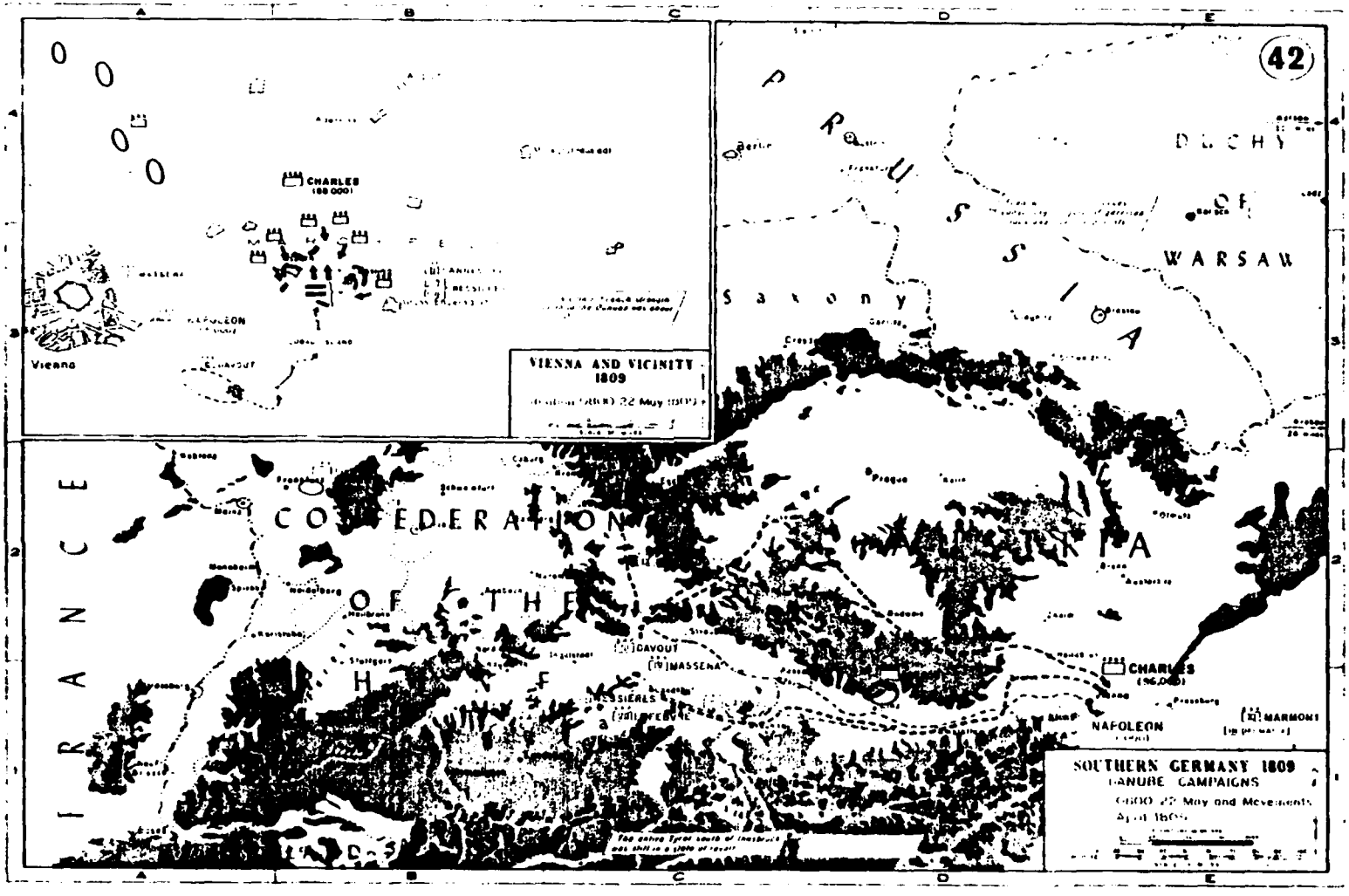
DIVISION RIVER CROSSING: ALB-F CONCEPT



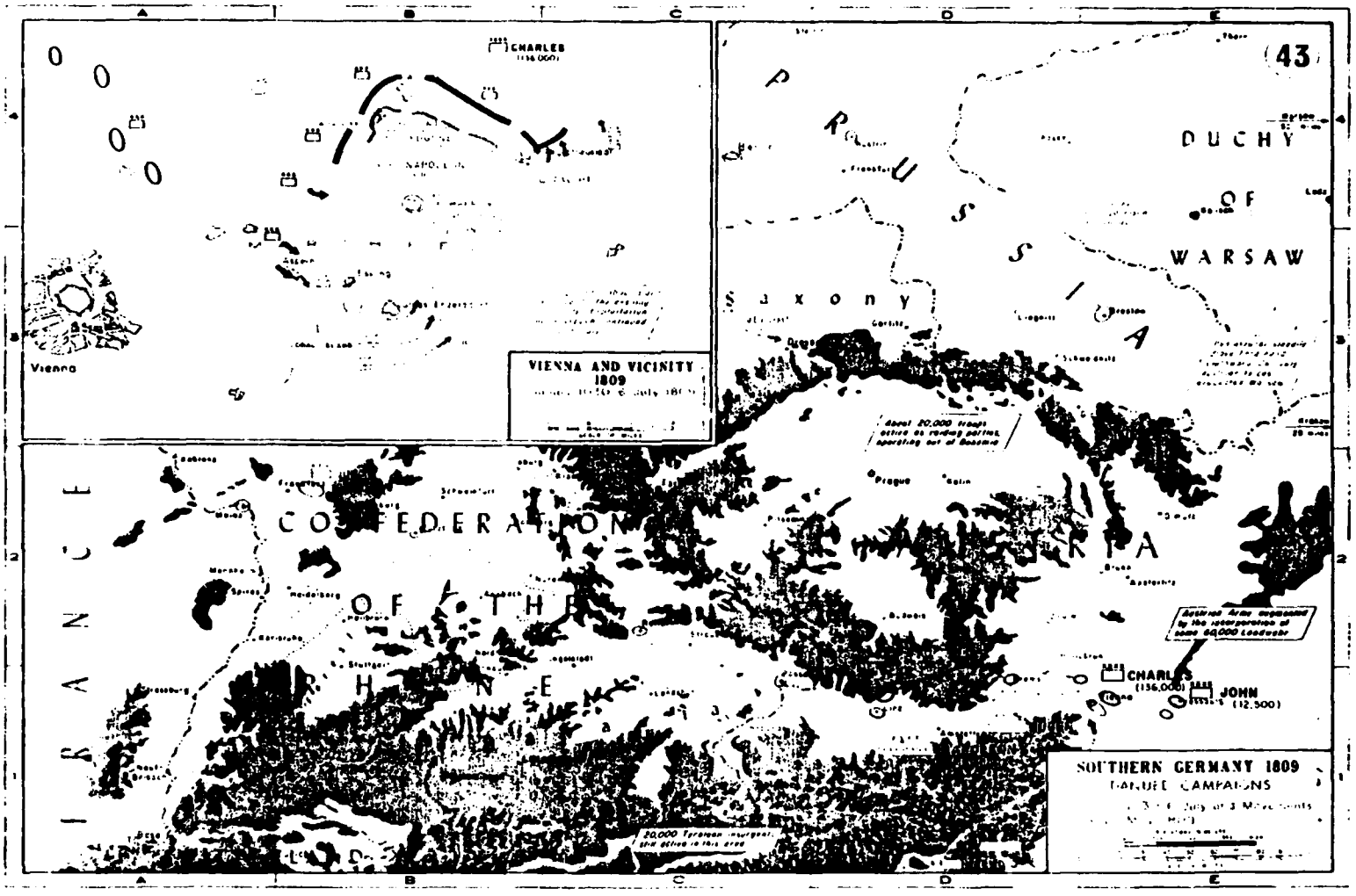
ANNEX E

NAPOLEON'S 1809 DANUBE CAMPAIGN

REFERENCE MAPS



Source: Atlas for the Wars of Napoleon (The West Point Military History Series), ed. Thomas E. Griess (Wayne, New Jersey: Avery Publishing Group, Inc., 1986), Map 42.

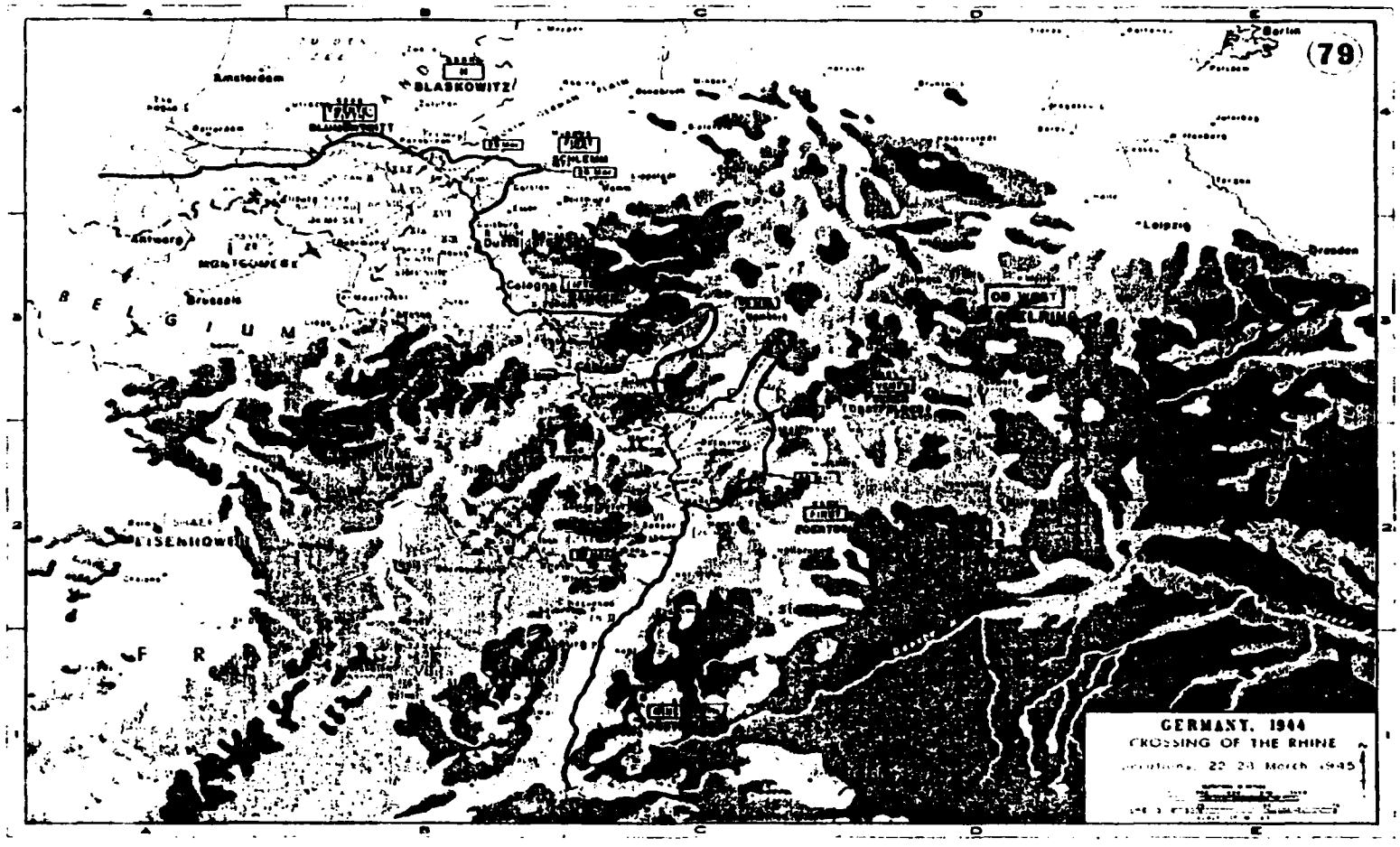


Source: Atlas for the Wars of Napoleon (The West Point Military History Series), ed. Thomas E. Griess (Wayne, New Jersey: Avery Publishing Group, Inc., 1986), Map 43.

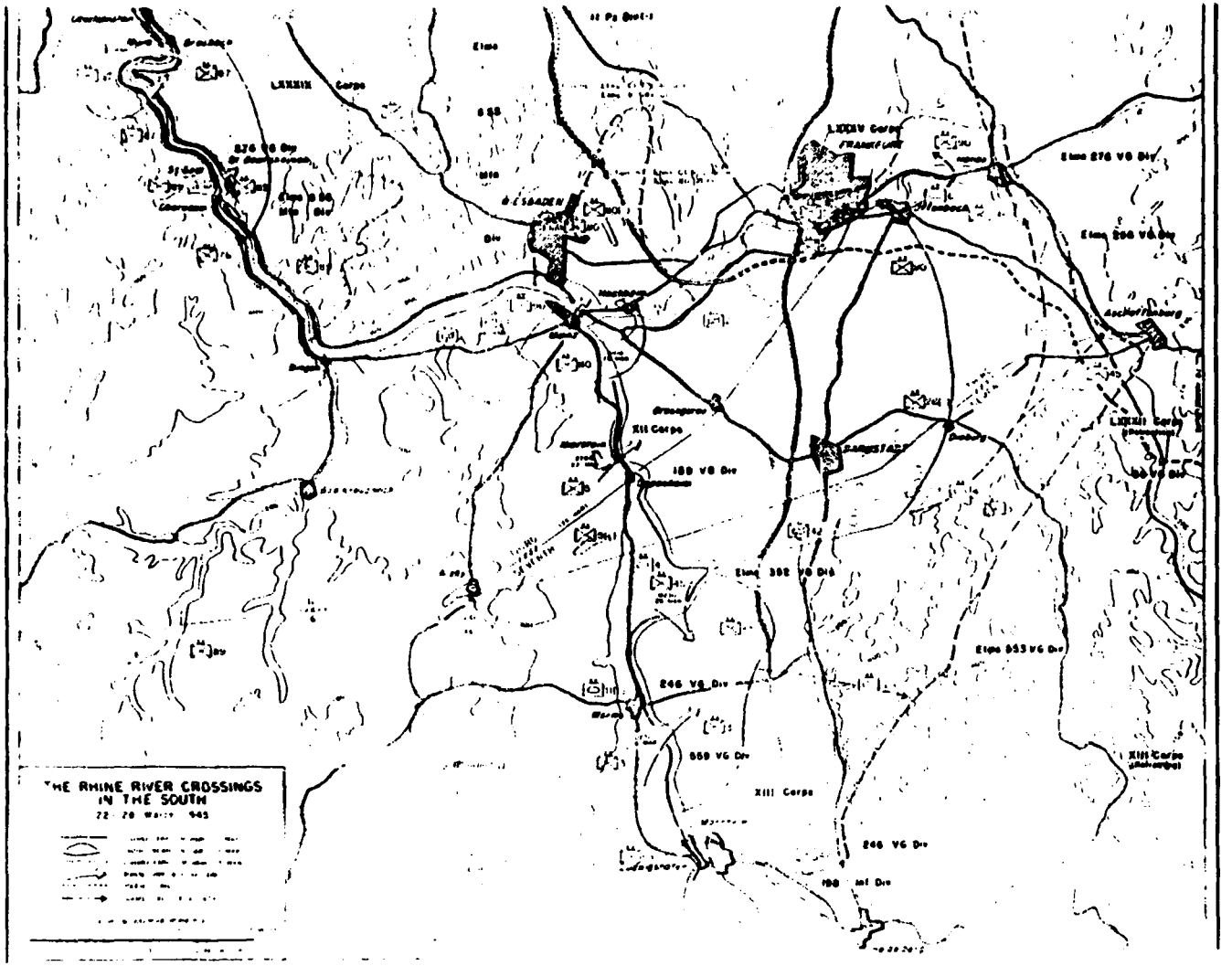
ANNEX F

PATTON'S CROSSING AT NIERSTEIN/OPPENHEIM

REFERENCE MAPS

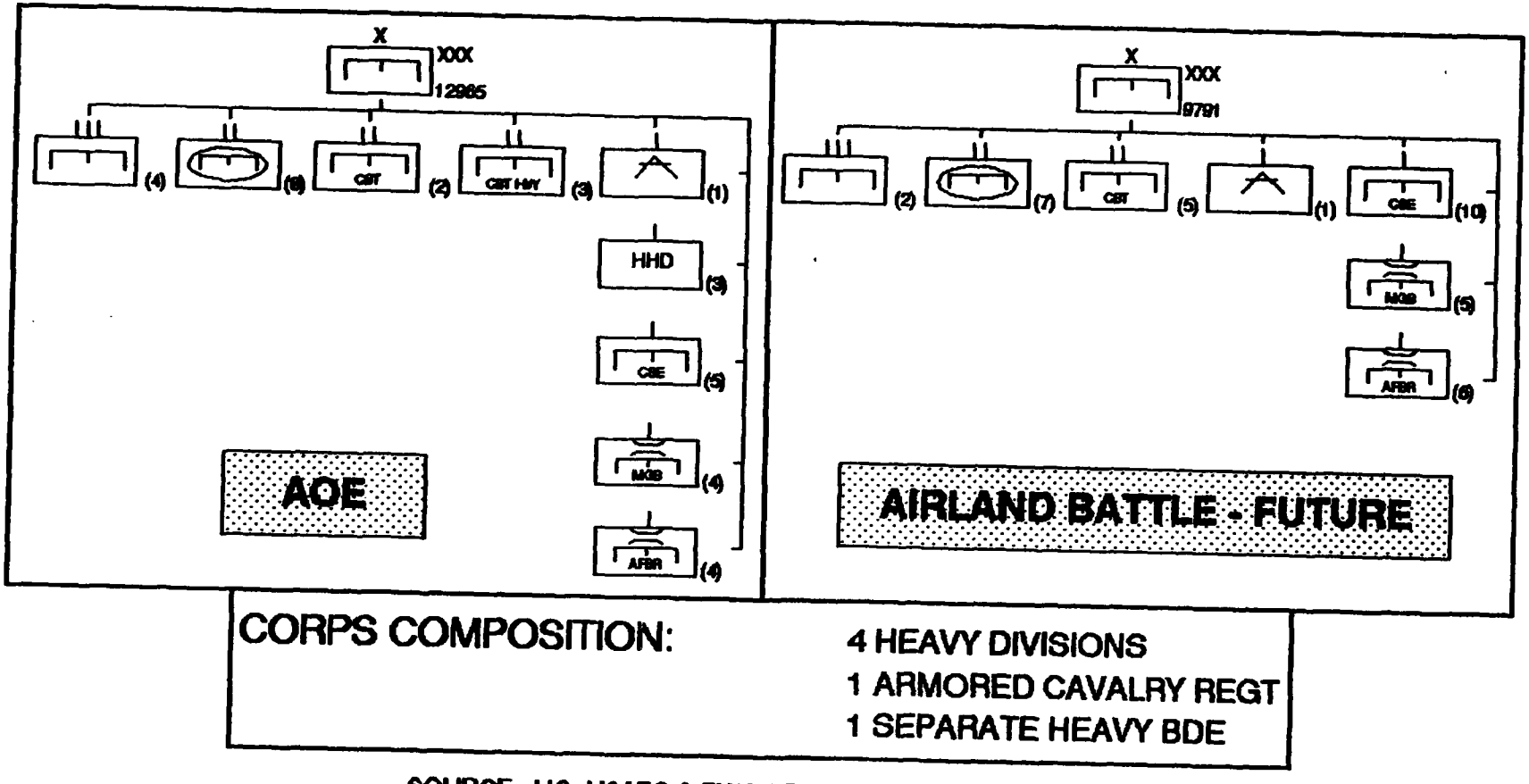


Source: Atlas for the Second World War: Europe and the Mediterranean (The West Point Military History Series), ed. Thomas E. Griess (Wayne, New Jersey: Avery Publishing Group, Inc., 1986), Map 79.



Source: Charles B. MacDonald, United States Army in World War II: The European Theater of Operations--The Last Offensive (Washington, D.C.: Office of the Chief of Military History, U.S. Army, 1973), Map X.

ANNEX G
CORPS ENGINEER BRIGADE COMPARISON

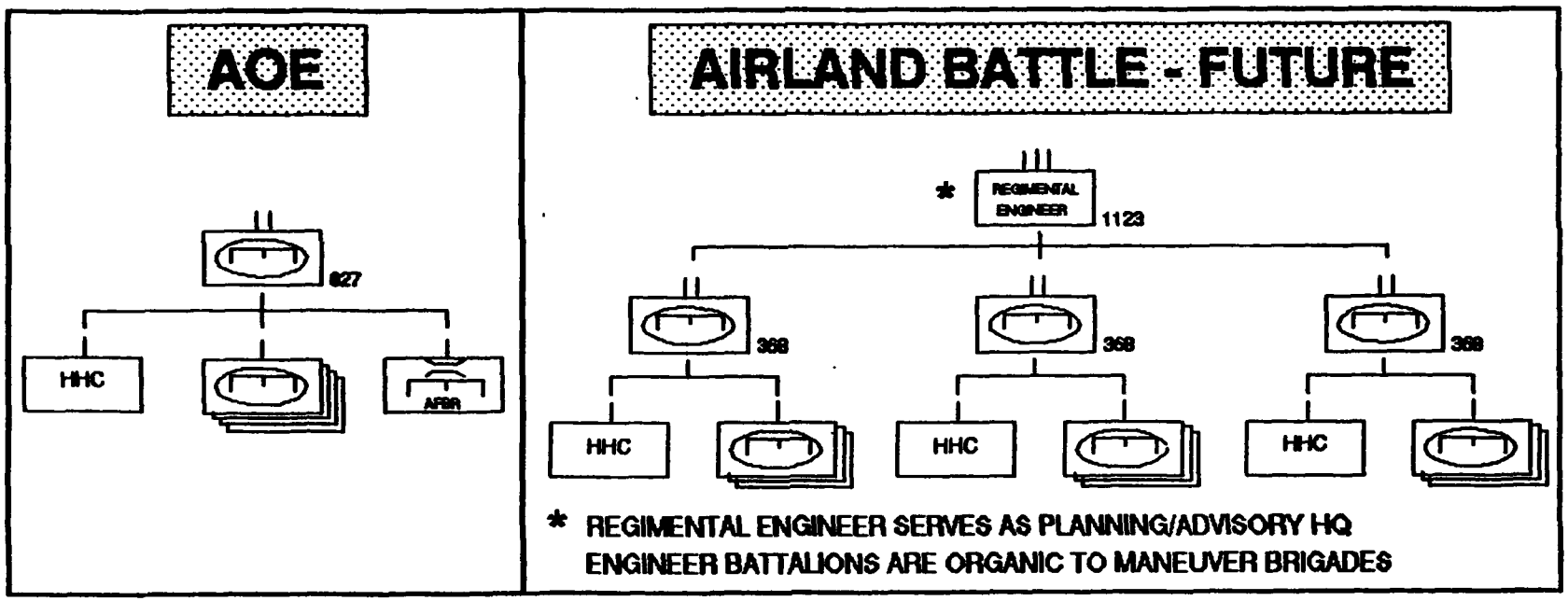


CORPS COMPOSITION:	4 HEAVY DIVISIONS
	1 ARMORED CAVALRY REGT
	1 SEPARATE HEAVY BDE

SOURCE: HQ, USAEC & FLW, ATSE-CDC-F (MAJ SEERLEY)

ANNEX H

HEAVY DIVISIONAL ENGINEER BATTALION COMPARISON



SOURCE: HQ, USAEC & FLW, ATSE-CDC-F (MAJ SEERLEY)

ANNEX I
CORPS CONDUCTED ALB-F RIVER CROSSING